DEREE COLLEGE SYLLABUS FOR: PY 3330 UNIVERSITY PHYSICS II	
(Updated Fall 2020)	**UK LEVEL 5** **UK CREDITS:20** **US CREDITS: 3/2/4**
PREREQUISITES:	MA 1008 College Algebra MA 2130 Calculus I PY 2225 University Physics I
CATALOG DESCRIPTION:	Principles in electricity, magnetism, the nature of light and electromagnetic radiation, wave phenomena, Einstein's Theories, the structure of the atom, quantum theory and nuclear physics.
RATIONALE:	This course is a continuation of PY 2200, University Physics I. It is designed to accommodate the Physics knowledge a student must have in order to pursue a degree in Life Sciences or Engineering. The course presents to students how things work in nature at an advanced level. People who will take this course must have a strong mathematical background as this course is a calculus based one. Physics uses qualitative and quantitative models and theories based on physical laws to visualise, explain and predict physical phenomena. Models, laws and theories are developed from, and their predictions are tested by making, observations and quantitative measurements. In this subject, students gather, analyse and interpret primary and secondary data to investigate a range of phenomena and technologies using some of the most important models, laws and theories of physics, including the, the atomic model, electromagnetic theory, quantum theory and the laws of Einstein's relativity.
LEARNING OUTCOMES:	As a result of taking this course, the student should be able to: 1. Demonstrate knowledge of electric forces and fields as well as the field line notation. Demonstrate understanding of motion of charges in terms of potential difference and the operation of batteries and capacitors. 2. Describe resistance and simplify DC circuits to aid in their analysis. Explain the difference between DC and AC and their usage in everyday life. Demonstrate knowledge of magnetic fields, their effects on current carrying conductors, Ampere's and Faraday's laws and the operation of transformers. 3. Discuss the nature of light and the electromagnetic spectrum. Describe practical applications of the different parts of the spectrum. Understand the ray model of light and use it with simple optical devices. Describe phenomena that indicate wave nature. Comprehend the basic principles of special and general relativity and their implications. 4. Describe Planck's hypothesis and its implications. Appreciate the wave-particle duality and discuss relevant effects. Understand the development of atomic theories from Democritus and Bohr to current quantum models. Comprehension of the Uncertainty Principle. Describe practical applications developed through quantum theory, such as semiconductors, lasers and superconductors. 5. Appreciate nuclear energy, through the knowledge of the forces which bind the nucleus. Describe nuclear fission and fusion in nuclear reactors and in the universe. 6. Apply the scientific method of work in laboratory activities as well as appreciate the effect of experimental uncertainties on lab results.
METHOD OF TEACHING AND LEARNING:	In congruence with the learning and teaching strategy of the college, the following tools are used:

<table>
<tr><td></td><td>

Class lectures, interactive learning (class discussions, group work) video presentations, and practical problems solved in class.
Exercises and primary source documents are assigned as homework, the solutions of which are reviewed in class
Laboratory work (laboratory reports will be required in full or partial format).
CD-ROMS – Films and/or Field Trips (Science Exhibitions, the Planetarium, the Nuclear Reactor or Accelerators).
Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture/lab material.
Use of a blackboard site, where instructors are free to post course documents, timely announcements, as well as additional resources.

</td></tr>
<tr><td>ASSESSMENT:</td><td>
Summative:
<table>
<tr><td>First assessment
a) Laboratory report-1 full lab report 10%
b) In-class midterm examination (1-hour), 30%
(Multiple choice, problem solving, short answers, matching, essay questions, combination</td><td>40%</td></tr>
<tr><td>Second assessment
a) Laboratory report-1 full lab report 10%
b) In-class final examination (2-hour, comprehensive), 50%
(Multiple choice, problem solving, short answers, matching, essay questions, combination)</td><td>60%</td></tr>
</table>
Formative:
<table>
<tr><td>1 Diagnostic test (In class or to take home)</td><td>0</td></tr>
</table>
For the course to be considered completed and for the student to earn the right to sit exams ALL experimental work and reports for every single experimental exercise must be handed within defined deadlines. However, only two will be evaluated.

Both Lab Reports are integral part of the course and is compulsory for all students. It enables them to demonstrate the application of their skills and knowledge, and to pursue their personal interests, without the time limitations and other constraints that are associated with written examinations.

The midterm examination tests all learning outcomes of the course as stated above from the beginning of classes until a week before the exam.

The final examination tests all Learning Outcomes and it is comprehensive.
</td></tr>
<tr><td>INDICATIVE READING:</td><td>
REQUIRED READING:
Serway/Jewett - ©2019, Physics for Scientists and Engineers with Modern Physics, Cengage, Latest Edition

RECOMMENDED READING:
</td></tr>
<tr><td>INDICATIVE MATERIAL:
(e.g. audiovisual, digital material, etc.)</td><td>
REQUIRED MATERIAL:

RECOMMENDED MATERIAL:
</td></tr>
<tr><td>COMMUNICATION REQUIREMENTS:</td><td></td></tr>
<tr><td>SOFTWARE REQUIREMENTS:</td><td>Microsoft Word, Excel for Windows.</td></tr>
</table>

WWW RESOURCES:	www.saunderscollege.com/physics/college www.krev.com http://physicsworld.com/ http://scienceworld.wolfram.com/physics/ http://arxiv.org/ http://www.physicsclassroom.com/ http://www.physicstoday.org/ http://www.iop.org/ http://phoenix.phys.clemson.edu/tutorials/index.html http://phet.colorado.edu/en/simulations/category/physics http://www.physicslessons.com/iphysics.htm http://surendranath.tripod.com/AppletsJ2.html
INDICATIVE CONTENT:	**Part 4: Electromagnetism** 21. Electric Charge and Electric Field 22. Gauss's Law 23. Electric Potential 24. Capacitance and Dielectrics 25. Current, Resistance, and Electromotive Force 26. Direct-Current Circuits 27. Magnetic Field and Magnetic Forces 28. Sources of Magnetic Field 29. Electromagnetic Induction 30. Inductance 31. Alternating Current 32. Electromagnetic Waves **Part 5: Optics** 33. The Nature and Propagation of Light 34. Geometric Optics 35. Interference 36. Diffraction **Part 6: Modern Physics** 37. Relativity 38. Photons: Light Waves Behaving as Particles 39. Particles Behaving as Waves 40. Quantum Mechanics 41. Atomic Structure 42. Molecules and Condensed Matter 43. Nuclear Physics 44. Particle Physics and Cosmology **PY 2330 LAB OUTLINE** Laboratory experiments will be carried out either through set-up applications or/and computer simulations. 1. Lab Safety and Regulations- Uncertainties, Graphical Analysis, how to Write an Experimental Report. 2. Coulomb's Law 3. Measurement of Resistance 4. Ohm's Law 5. Parallel Plate Capacitor 6. Magnetic Fields and Forces 7. Law of Electromagnetism 8. Induction – Faraday's Law 9. Reflection / Refraction / Diffraction or Wave Interference 10. Planck's Constant 11. Photoelectric Effect 12. Radioactive Decay 13. Relativistic Effects
